

What Is Claimed Is:

1 1. An isolated nucleic acid molecule encoding a
2 Rickettsia felis outer membrane protein.

1 2. The isolated nucleic acid molecule of claim 1
2 wherein said nucleic acid is deoxyribonucleic acid.

1 3. The isolated nucleic acid molecule of claim 2
2 wherein said deoxyribonucleic acid is cDNA.

1 4. The isolated nucleic acid molecule of claim 3
2 wherein said nucleic acid molecule has a nucleotide
3 sequence as shown in SEQ ID NO:1.

1 5. The isolated nucleic acid molecule of claim 1
2 wherein said nucleic acid molecule encodes an amino acid
3 sequence as shown in SEQ ID NO:2.

1 6. The isolated nucleic acid molecule of claim 1
2 wherein said nucleic acid is ribonucleic acid.

1 7. The isolated nucleic acid molecule of claim 6
2 wherein said ribonucleic acid is mRNA.

1 8. A nucleic acid molecule complementary to at
2 least a portion of the mRNA of claim 7.

1 9. A cell comprising the nucleic acid molecule of
2 claim 8.

1 10. An expression vector comprising the nucleic
2 acid molecule of claim 8.

I
1 11. A cell comprising the expression vector of
2 claim 10.

II
1 12. A method of decreasing expression of a
2 Rickettsia felis outer membrane protein in a host cell,
3 said method comprising introducing the nucleic acid
4 molecule of claim 8 into the cell, wherein said nucleic
5 acid molecule blocks translation of said mRNA so as to
6 decrease expression of said Rickettsia felis outer
7 membrane protein in said host cell.

1 13. A cell comprising the nucleic acid molecule of
2 claim 1.

I
1 14. An expression vector comprising the nucleic
2 acid molecule of claim 1.

1 15. A cell comprising the expression vector of
2 claim 14.

I
1 16. A method of increasing expression of Rickettsia
2 felis outer membrane protein in a host cell, said method
3 comprising:
4 introducing the nucleic acid molecule of
5 claim 1 into the cell; and
6 allowing said cell to express said nucleic acid
7 molecule resulting in the production of Rickettsia felis
8 outer membrane protein in said cell.

1 17. A method of screening a substance for the
2 ability of the substance to modify Rickettsia felis outer
3 membrane protein function, said method comprising:

III

4 introducing the nucleic acid molecule of claim 1
5 into a host cell;
6 expressing said Rickettsia felis outer membrane
7 protein encoded by said nucleic acid molecule in the host
8 cell;
9 exposing the cell to a substance; and
10 evaluating the exposed cell to determine if the
11 substance modifies the function of the Rickettsia felis
12 outer membrane protein.

1 18. The method of claim 17 wherein said evaluation
2 comprises monitoring the expression of Rickettsia felis
3 outer membrane protein.

IV

1 19. A method of obtaining DNA encoding a Rickettsia
2 felis outer membrane protein, said method comprising:
3 selecting a DNA molecule encoding a Rickettsia felis
4 outer membrane protein, said DNA molecule having a
5 nucleotide sequence as shown in SEQ ID NO:1;
6 designing an oligonucleotide probe for a Rickettsia
7 felis outer membrane protein based on SEQ ID NO:1;
8 probing a genomic or cDNA library of an organism
9 with the oligonucleotide probe; and
10 obtaining clones from said library that are
11 recognized by said oligonucleotide probe, so as to obtain
12 DNA encoding a Rickettsia felis outer membrane protein.

V

1 20. A method of obtaining DNA encoding a Rickettsia
2 felis outer membrane protein, said method comprising:
3 selecting a DNA molecule encoding a Rickettsia
4 felis outer membrane protein, said DNA molecule having a
5 nucleotide sequence as shown in SEQ ID NO:1;

6 designing degenerate oligonucleotide primers
7 based on SEQ ID NO:1; and
8 utilizing said oligonucleotide primers in a
9 polymerase chain reaction on a DNA sample to identify
10 homologous DNA encoding a Rickettsia felis outer membrane
11 protein in said sample.

1 21. An isolated nucleic acid molecule encoding a
2 Rickettsia felis outer membrane protein, said nucleic
3 acid molecule encoding a first amino acid sequence having
4 at least 90% amino acid identity to a second amino acid
5 sequence, said second amino acid sequence as shown in SEQ
6 ID NO:2.

1 22. A DNA oligomer capable of hybridizing to the
2 nucleic acid molecule of claim 1.

1 23. A method of detecting presence of a Rickettsia
2 felis outer membrane protein in a sample, said method
3 comprising:
4 contacting a sample with the DNA oligomer of claim
5 22, wherein said DNA oligomer hybridizes to any of said
6 Rickettsia felis outer membrane protein present in said
7 sample, forming a complex therewith; and
8 detecting said complex, thereby detecting presence
9 of a Rickettsia felis outer membrane protein in said
10 sample.

1 24. The method of claim 23 wherein said DNA
2 oligomer is labeled with a detectable marker.

1 25. An isolated Rickettsia felis outer membrane
2 protein.

1 26. The Rickettsia felis outer membrane protein of
2 claim 25 wherein said Rickettsia felis outer membrane
3 protein is encoded by a nucleotide sequence as shown in
4 SEQ ID NO:1.

1 27. The Rickettsia felis outer membrane protein of
2 claim 25 wherein said Rickettsia felis outer membrane
3 protein is encoded by an amino acid sequence as shown in
4 SEQ ID NO:2.

1 28. An isolated Rickettsia felis outer membrane
2 protein encoded by a first amino acid sequence having at
3 least 90% amino acid identity to a second amino acid
4 sequence, said second amino acid sequence as shown in SEQ
5 ID NO:2.

1 29. An antibody or antigen-binding fragment thereof
2 specific for the Rickettsia felis outer membrane protein
3 of claim 28.

1 30. A composition comprising the Rickettsia felis
2 outer membrane protein of claim 28 or an antigenic
3 portion thereof and a compatible carrier.

1 31. A method of detecting presence of a Rickettsia
2 felis outer membrane protein in a sample, said method
3 comprising:
4 contacting a sample with the antibody or antigen-
5 binding fragment thereof of claim 29, wherein said
6 antibody or antigen-binding fragment thereof binds to any
7 of said Rickettsia felis outer membrane protein present
8 in said sample, forming a complex therewith; and

9 detecting said complex, thereby detecting presence
10 of a Rickettsia felis outer membrane protein in said
11 sample.

IX
1 32. The method of claim 31 wherein said antibody or
2 fragment thereof is labeled with a detectable marker.

1 33. A method of preventing Rickettsia felis
2 infections by Rickettsia felis present in a carrier host,
3 the method comprising administering to the carrier host
4 an amount of a compound effective to modify levels of
5 functional Rickettsia felis outer membrane protein in
6 Rickettsia felis present in the carrier host.

1 34. The method of claim 33 wherein the compound
2 modifies levels of functional Rickettsia felis outer
3 membrane protein by modifying Rickettsia felis outer
4 membrane protein gene expression.

1 35. The method of claim 34 wherein modifying
2 Rickettsia felis outer membrane protein gene expression
3 comprises exposing the carrier host to a compound which
4 modifies Rickettsia felis outer membrane protein gene
5 expression.

1 36. The method of claim 33 wherein the compound is
2 an inhibitor of the functional Rickettsia felis outer
3 membrane protein.

1 37. The method of claim 33 wherein the carrier host
2 is a cat flea.

1 38. A method of reducing Rickettsia felis infection
2 of a carrier host, the method comprising administering to
3 the carrier host an amount of a compound effective to
4 prevent function of a Rickettsia felis outer membrane
5 protein in the carrier host.

1 39. The method of claim 38 wherein the compound
2 prevents function of a Rickettsia felis outer membrane
3 protein by modifying Rickettsia felis outer membrane
4 protein gene expression.

1 40. The method of claim 39 wherein modifying
2 Rickettsia felis outer membrane protein gene expression
3 comprises exposing the carrier host to a compound which
4 modifies Rickettsia felis outer membrane protein gene
5 expression.

1 41. The method of claim 38 wherein the compound is
2 an inhibitor of the functional Rickettsia felis outer
3 membrane protein.

1 42. The method of claim 38 wherein the carrier host
2 is a cat flea.
